

# PATENT ABSTRACTS OF JAPAN

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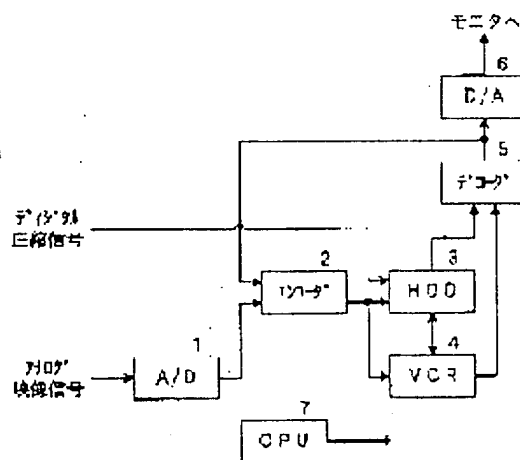
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## (54) SIGNAL RECORDING AND REPRODUCING DEVICE

### (57)Abstract:

PROBLEM TO BE SOLVED: To provide a recording and reproducing device that can record signals for a long time and quickly conduct random access.

SOLUTION: An HDD section 3 records a compression signal resulting from applying compression encoding to a program signal. The hard disk of the HDD section 3 has a storage capacity of recording at least a plurality of programs and records a new program while deleting programs having viewed and not delete protect on the hard disk through overwriting when the idle area cannot sufficiently be reserved. Furthermore, when the area above is not available, while a VCR section 4 records the viewed program, a new program is recorded on the hard disk. The bit rate is suppressed in the case off recording the viewed program by the VCR section 4.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a suitable image sound signal record regenerative apparatus to record image sound signals, such as television broadcasting.

[0002]

[Description of the Prior Art] Although it considers as the equipment which carries out record playback of the image sound signals, such as television broadcasting, and the video tape recorder of a VHS (trademark) method has spread widely, the digital tape recorder which can carry out record playback of the image sound signal with the gestalt of a digital signal is developed with digitization of television broadcasting, and it is spreading.

[0003] While this digital tape recorder has the description that the long duration record of the digital image sound signal which changed into digital signal aspect the analog image sound signal which carries out Iriki by the digital image sound signal which carries out Iriki by digital signal aspect, or the signal aspect of an analog can be carried out at a tape-recording medium, the random access of the recorded image sound signal takes time amount to it.

[0004] Moreover, although the record regenerative apparatus of an image sound signal using HDD appeared in recent years, while the record regenerative apparatus using this HDD had the description that random access of the recorded image sound signal could be performed quickly, its chart lasting time of an image sound signal was short, and it had the fault that an image sound signal was unrecordable more than chart lasting time recordable on the record medium formed in the interior of equipment.

[0005]

[Problem(s) to be Solved by the Invention] In such a situation, although the image sound signal record regenerative apparatus which combined two record regenerative apparatus of a tape-recording regenerative apparatus and a disk record regenerative apparatus is being developed, it has been a big technical problem how a tape unit and a disk unit are used properly, employing the description of each record medium and a recording apparatus efficiently.

[0006]

[Means for Solving the Problem] In order to solve the above technical problem, the signal record regenerative apparatus concerning this invention It is the signal record regenerative apparatus in which an account rec/play student is possible with the gestalt of a compression signal about the viewing-and-listening program by which compression coding was carried out by the predetermined compression coding method. The viewing-and-listening program of the gestalt of said compression signal The 1st record playback means in which an account rec/play student is possible to the 1st removable record medium, The 2nd record medium which is not removable is equipped with the 2nd record playback means in which an account rec/play student is possible for the viewing-and-listening program of the gestalt of said compression signal at least. In each viewing-and-listening program currently recorded on said 2nd record medium The flag of whether to give the flag of whether to be viewing-and-listening ending and elimination protection for every viewing-and-listening program is attached. In case a new

viewing-and-listening program is recorded on said 2nd record medium, while recording said new viewing-and-listening program on the field to which the viewing-and-listening program by which viewing-and-listening-ending and elimination protection are not carried out with reference to said flag is recorded. When said field does not exist, it is characterized by recording this with said 1st record playback means, while reproducing the viewing-and-listening program by which viewing-and-listening-ending and elimination protection are carried out, and recording said new viewing-and-listening program on the field which finished said playback.

[0007] Moreover, in case the signal record regenerative apparatus concerning this invention records a new viewing-and-listening program on said 2nd record medium. When a viewing-and-listening program of finishing [viewing and listening] does not exist on said 2nd record medium, it is characterized by recording this with said 1st record playback means, while reproducing the viewing-and-listening program to which it is not viewed and listened on said 2nd record medium, and recording said new viewing-and-listening program on the field which finished playback on said 2nd record medium.

[0008] Moreover, the decoder which performs expanding processing of said compression coding method to the viewing-and-listening program of the gestalt of the compression signal which reproduced the signal record regenerative apparatus concerning this invention with said 2nd record playback means, The viewing-and-listening program which carried out expanding processing by said decoder is equipped with the encoder which performs compression processing of said compression coding method. In case the viewing-and-listening program reproduced with said 2nd record playback means is recorded with said 1st record playback means. Said encoder is controlled so that said encoder outputs the high compression signal which is a low bit rate from said compression signal, and it is characterized by said 1st record playback means recording said viewing-and-listening program of the gestalt of said low compression signal which said encoder outputs.

[0009]

[Embodiment of the Invention] Drawing 1 is drawing for explaining the signal record regenerative apparatus concerning the example of this invention, and the A/D converter which the analog video signal by analog television broadcasting etc. carries out Iriki of 1, and changes this into a digital video signal, and 2 are encoders which perform compression coding processing of an MPEG 2 method to the digital video signal changed with A/D converter 1.

[0010] In addition, the digital video signal from a decoder 5 mentioned later is also supplied to the encoder 2, either the digital video signal from A/D converter 1 or the digital video signal from a decoder 5 is chosen, and an encoder 2 can carry out compression coding processing.

[0011] 3 the compression signal of the MPEG 2 method by a compression signal or digital television broadcast etc. by which compression coding processing was carried out with the encoder 2 to an MPEG 2 method. Moreover, the HDD section in which an account rec/play student is possible, 4 is the VCR section in which an account rec/play student is possible about the compression signal from an encoder 2, the HDD section 3 carries out record playback of the compression signal by using a hard disk as a record medium, and the VCR section 4 uses the magnetic tape of a D-VHS (trademark) method as a record medium, and it carries out record playback of the compression signal. And like illustration, the HDD section 3 and the VCR section 4 interconnect, and they are constituted so that the compression signal on each record medium can be copied to other record media.

[0012] Moreover, the decoder which performs expanding processing of an MPEG 2 method to the compression signal with which the HDD section 3 or the VCR section 4 reproduced 5, and 6 are D/A converters which change into an analog video signal the digital video signal restored by the decoder 5. Furthermore, 7 is CPU and is controlling each part of the signal record regenerative apparatus to illustrate.

[0013] Although it is the signal record regenerative apparatus constituted as mentioned above, simultaneous operation is possible for an encoder 2 and a decoder 5, an encoder 2 can carry out compression coding in two or more bit rates which change an input digital video signal with control of CPU 7, and a decoder 5 can carry out expanding processing of the compression signal of two or more different bit rates. Moreover, although not explained in full detail here, it cannot be overemphasized in

the HDD section 3 and the VCR section 4 that an account rec/play student is possible for a sound signal with a video signal.

[0014] Hereafter, actuation of the signal record regenerative apparatus concerning the example of this invention is explained. In case a user records analog television broadcasting on videotape, the analog video signal by analog television broadcasting carries out I/riki to A/D converter 1, and A/D converter 1 changes this analog video signal into a digital video signal. Thus, the acquired digital video signal is changed into the compression signal of a high bit rate with an encoder 2, and this compression signal is recorded in the HDD section 3.

[0015] On the other hand, in case digital television broadcast is recorded on videotape, the digital compression signal by digital television broadcast carries out I/riki to the HDD section 3, and the HDD section 3 records this compression signal. By digital television broadcast, program related information is transmitted apart from the compression signal recorded in the HDD section 3, and the index information on the program recorded based on this program related information is generated with the signal record regenerative apparatus shown here.

[0016] Although it is stored in the management domain which index information is generated automatically and illustrated in case it is constituted by broadcast or chart lasting time of a program title and a program etc. and digital television broadcast is recorded on videotape, when this index information records analog television broadcasting on videotape, the user itself will create index information and it will store it in a management domain.

[0017] And a user can add the flag of elimination protection for every program while being able to check in the display screen which does not illustrate the index information on the program currently recorded on the hard disk of the HDD section 3 at least. Moreover, to each program which does in this way and is recorded on a hard disk, the flag non-listened [ view and ] is added, and once playback is performed, this flag will be removed. In addition, it is also possible such flag information and for a user to check the program non-listened [ view and ] in the display screen, to choose the program to which it is not viewed and listened [ this ], and to reproduce in the HDD section 3, since it can check as a part of index information in the display screen.

[0018] And if a user chooses a program and makes it reproduce in the HDD section 3, expanding processing will be carried out by the decoder 5, and the reproduced compression signal will be outputted to the monitor which is not further illustrated after being changed into an analog video signal with D/A converter 6. Although record playback of the program by analog television broadcasting or digital television broadcast is carried out in the above actuation, since record playback of the analog television broadcasting is carried out after compression coding processing of the high bit rate in an encoder 2 is performed, and record playback of the digital television broadcast is carried out, without processing compression expanding, it becomes that it is possible in outputting to a monitor, without following image quality degradation in these programs.

[0019] Next, the free area of the hard disk in the HDD section 3 decreases, and actuation when it becomes impossible to record a new program in the HDD section 3 is explained. For example, CPU7 processes as the following based on the index information on each program stored in the management domain at the same time it starts the image transcription of a new program in the HDD section 3 when there is not an enough free area of a hard disk in case a user records analog television broadcasting or digital television broadcast on videotape.

[0020] Drawing 2 shows the flow to which CPU7 checks the flag attached for every program as index information, and performs it to each program currently recorded on the hard disk. CPU7 is [0021] which distinguishes whether each program which checks the existence of an elimination protection flag while checking the existence of the flag non-listened [ view and ] to each program currently recorded on the hard disk, and is recorded on the hard disk is which category of A thru/or D. The program of Category A is a program to which the flag non-listened [ view and ] and the elimination protection flag were given here, the program of Category B is a program to which only the flag non-listened [ view and ] was given, the program of Category C is a program to which only the elimination protection flag was given, and the program of Category D is a program to which a non-listened [ view and ] flag or elimination

protection flag is not given, either.

[0022] And according to the flow shown in drawing 3, the program eliminated or copied is determined next. When there is a program of Category D, CPU7 controls the HDD section 3 so that overwrite record of the program new to the field on the hard disk with which the oldest program by Category D is recorded is carried out. That is, it is viewing-and-listening ending, and when there is a program to which an elimination protection flag is not given, overwrite elimination is carried out from the oldest thing of such a program at order.

[0023] Moreover, when there is no program of Category D and there is a program of Category C, CPU7 controls the HDD section 3, reproducing the oldest program by Category C so that overwrite record of the program new to the field on the hard disk which finished playback is carried out. And the program reproduced in the HDD section 3 controls the VCR section 4 to be recorded in the VCR section 4.

[0024] That is, although there is a program [ finishing / viewing and listening ], when there is only a program to which the elimination protection flag is given as a program [ finishing / viewing and listening ], such a program is reproduced sequentially from the oldest thing, and the reproduced program is recorded on a magnetic tape in the VCR section 4.

[0025] Moreover, while CPU7 controls the HDD section 3, reproducing the oldest program by Category B so that overwrite record of the program new to the field on the hard disk which finished playback is carried out when the program of Category D does not have the program of Category C, either and has the program of Category B, the VCR section 4 is controlled so that the reproduced program is recorded in the VCR section 4.

[0026] That is, there is no program [ finishing / viewing and listening ], when there is a program to which an elimination protection flag is not given in the program non-listened [ view and ], such a program is reproduced sequentially from the oldest thing, and the reproduced program is recorded on a magnetic tape in the VCR section 4.

[0027] And while CPU7 controls the HDD section 3, reproducing the oldest program by Category A so that overwrite record of the program new to the field on the hard disk which finished playback is carried out when there is only a program of Category A, the VCR section 4 is controlled so that the reproduced program is recorded in the VCR section 4.

[0028] That is, when there is no program [ finishing / viewing and listening ] and there is only a program to which the elimination protection flag is given as a program non-listened [ view and ], such a program is reproduced sequentially from the oldest thing, and the reproduced program is recorded on a magnetic tape in the VCR section 4.

[0029] Since it is based on priority and the program on a hard disk is eliminated or copied like the above, the program which finishes viewing and listening and does not have elimination protection and which does not have the need for preservation, for example is eliminated first, next although viewing and listening was finished, the program with elimination protection the user recognizes the need for preservation to be, for example is moved to the VCR section 4.

[0030] and when the program which finished viewing and listening does not exist, the program without elimination protection which the user recorded for the time being, for example moves to the VCR section 4 by viewing and un-listening -- having -- the above -- the user who has elimination protection by viewing and un-listening when any program cannot be found -- immediately -- also coming out -- the program to which he plans to view and listen is moved to the VCR section 4. Since a record section is secured on a hard disk as mentioned above, in case record of a new program is started, even if there is no sufficient free area, it becomes possible to record a new program.

[0031] Moreover, although the program on a hard disk is reproduced and this is recorded in the VCR section 4, recording a new program as mentioned above, when the newly recorded program is what is depended on digital television broadcast, the bit rate of the program reproduced in the HDD section 3 can be lowered, and it can record in the VCR section 4.

[0032] That is, it becomes possible to reduce the amount of information as a compression signal by once carrying out expanding processing of the program reproduced in the HDD section 3 by the decoder 5, and performing compression coding processing of a low bit rate with an encoder 2 further. That is, it

becomes possible by raising the compressibility in an encoder 2 to reduce the amount of information as a compression signal.

[0033] Here, in case chart lasting time and a record bit rate have the 1st and 2nd mutually different recording modes and record the VCR section 4 by the 2nd recording mode, while it can make chart lasting time  $n$  times ( $n$  is the two or more natural numbers) using the same magnetic tape compared with the time of recording by the 1st recording mode, a record bit rate becomes  $1/n$  time.

[0034] The bit rate of the compression signal recorded in the HDD section 3 and by being in agreement with the record bit rate of the 1st recording mode in the VCR section 4 To save the program recorded in the HDD section 3, with the image quality maintained While outputting a direct compression signal to the VCR section 4 from the HDD section 3 as the 1st recording mode, the recording mode in the VCR section 4 to reduce and save the amount of the magnetic tape used What is necessary is to carry out compression coding processing again and just to record the compression signal which reproduced the recording mode in the VCR section 4 from the HDD section 3 as the 2nd recording mode in the VCR section 4 on the compression signal of the low bit rate in an encoder 2.

[0035] In addition, although the above explanation showed the example using the hard disk as a record medium which is not removable, using the magnetic tape of a D-VHS method as a removable record medium, it cannot be overemphasized by replacing the HDD section 3 and the VCR section 4 with the record playback section of other methods that it is possible to use record media other than this.

[0036] That is, instead of the VCR section 4, the record playback means of other methods use a disk record playback means, for example, and using the record medium which is not removable instead of the HDD section 3 using a removable record medium may be used. In addition, a removable record medium means the record medium whose removal is possible from a record playback means, and means the record medium whose removal is impossible from a record playback means in the record medium which is not removable here.

[0037] Moreover, although the HDD section 3 and the VCR section 4 explained as a thing in the interior of this signal record regenerative apparatus, either the HDD section 3 or the VCR section 4 is not cared about with the above explanation as other configurations. For example, when the HDD section 3 is considered as other configurations, it is also possible to connect between the 1st equipment which carried out the internal organs of an encoder 2, a decoder 5, CPU7, and the VCR section 4 at least, and the 2nd equipment which carried out the internal organs of the HDD section 3 with the digital interface based on IEEE1394 specification, to perform exchange with the HDD section with more large storage capacity, and to extend the HDD section.

[0038] Moreover, when the VCR section 4 is considered as other configurations, it is also possible to connect between the 3rd equipment which carried out the internal organs of an encoder 2, a decoder 5, CPU7, and the HDD section 3 at least, and the 4th equipment which carried out the internal organs of the VCR section 4 at least with the digital interface based on IEEE1394 specification.

[0039] In addition, it is also possible in that case to constitute the 3rd equipment from a personal computer and to constitute the 4th equipment from a digital tape recorder. That is, the signal recording device applied to this invention on a personal computer and a digital tape recorder can be constituted by using CPU7 and hard disk drive for CPU in a personal computer as an HDD section 3, and performing compression signal processing in an encoder 2 and a decoder 5 by the hardware of software processing or an onboard.

[0040] Moreover, it cannot be overemphasized that the 5th equipment which carried out the internal organs of an encoder 2, a decoder 5, and CPU7 at least, the 6th equipment which carried out the internal organs of the HDD section 3, and the 7th equipment which carried out the internal organs of the VCR section 4 may be connected with the digital interface based on IEEE1394 specification, respectively, and the 5th equipment may be constituted from a personal computer.

[0041]

[Effect of the Invention] When the viewing-and-listening program by which viewing-and-listening-ending and elimination protection are not carried out exists on the 2nd record medium which is not removable according to invention concerning claim 1 While recording a new viewing-and-listening

program using the field where this viewing-and-listening program is recorded first, when there is such no field While reproducing the viewing-and-listening program by which viewing-and-listening-ending and elimination protection are carried out, in order to record this on the 1st removable record medium and to record a new viewing-and-listening program using the field which finished playback, Even if there is no free area sufficient on the 2nd record medium, the effectiveness that a new viewing-and-listening program is recordable is done so.

[0042] moreover, even when a viewing-and-listening program of finishing [ viewing and listening ] does not exist on the 2nd record medium according to invention concerning claim 2 In order to record this on the 1st record medium and to record a new viewing-and-listening program using the field which finished playback, reproducing the viewing-and-listening program non-listened [ view and ], Even when there is no free area sufficient on the 2nd record medium and the viewing-and-listening program of finishing [ viewing and listening ] is not recorded, the effectiveness that a new viewing-and-listening program is recordable is done so.

[0043] Moreover, since a bit rate is reduced in case the viewing-and-listening program reproduced from the 2nd record medium is recorded with the 1st record medium according to invention concerning claim 3, the effectiveness that many viewing-and-listening programs are recordable with a 1st record-medium top is done so.

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[Translation done.]

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CLAIMS

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[Claim(s)]

[Claim 1] It is the signal record regenerative apparatus in which an account rec/play student is possible with the gestalt of a compression signal about the viewing-and-listening program by which compression coding was carried out by the predetermined compression coding method. The viewing-and-listening program of the gestalt of said compression signal The 1st record playback means in which an account rec/play student is possible to the 1st removable record medium, The 2nd record medium which is not removable is equipped with the 2nd record playback means in which an account rec/play student is possible for the viewing-and-listening program of the gestalt of said compression signal at least. In each viewing-and-listening program currently recorded on said 2nd record medium The flag of whether to give the flag of whether to be viewing-and-listening ending and elimination protection for every viewing-and-listening program is attached. In case a new viewing-and-listening program is recorded on said 2nd record medium, while recording said new viewing-and-listening program on the field to which the viewing-and-listening program by which viewing-and-listening-ending and elimination protection are not carried out with reference to said flag is recorded The signal record regenerative apparatus characterized by recording this with said 1st record playback means while reproducing the viewing-and-listening program by which viewing-and-listening-ending and elimination protection are carried out, when said field does not exist, and recording said new viewing-and-listening program on the field which finished said playback.

[Claim 2] In case a new viewing-and-listening program is recorded on said 2nd record medium, when a viewing-and-listening program of finishing [ viewing and listening ] does not exist on said 2nd record medium, The signal record regenerative apparatus according to claim 1 characterized by recording this with said 1st record playback means while reproducing the viewing-and-listening program to which it is not viewed and listened on said 2nd record medium, and recording said new viewing-and-listening program on the field which finished playback on said 2nd record medium.

[Claim 3] The decoder which performs expanding processing of said compression coding method to the viewing-and-listening program of the gestalt of the compression signal reproduced with said 2nd record playback means, The viewing-and-listening program which carried out expanding processing by said decoder is equipped with the encoder which performs compression processing of said compression coding method. In case the viewing-and-listening program reproduced with said 2nd record playback means is recorded with said 1st record playback means Said encoder is controlled so that said encoder outputs the high compression signal which is a low bit rate from said compression signal. The signal record regenerative apparatus according to claim 1 or 2 characterized by said 1st record playback means recording said viewing-and-listening program of the gestalt of said low compression signal which said encoder outputs.

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[Translation done.]